

DSN Monitor Analysis System

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This article describes the status of the Deep Space Network Monitor Analysis Group and the progress of the monitor system as it relates to its ability to support flight projects utilizing the Mark III software packages and the 360/75 computer.

I. Introduction

There are some major changes within the Monitor System occurring in both the facilities and the operation group. These changes have necessitated personnel and procedure changes within the Deep Space Network Monitor Group at the SFOF.

The Monitor Group has taken a positive role in the development of the DSN monitor at the SFOF, has become more aware of the monitor system hardware, software, and conceptual design, and the system is developing into a more meaningful and useful activity.

II. Software Status

In assessing the status of the monitor software, "delivered" means that the software is operational. There may be some minor problems, but it is not a major catastrophe if they are not solved.

As of April 19, 1971 the status of the software was as shown in Table I.

In the Monitor software development, there are two serious problems. Work-around procedures have been

established at this time to accommodate the software slippage.

- (1) Ability to produce validated system data record (SDR). The workaround is to require that DSIF monitor Digital Instrumentation Subsystem (DIS) log tapes be retained for a period of not less than 30 days. These tapes may be mailed to the SFOF for analysis and evaluation.
- (2) No computer driven alarm processor. The workaround for this is to require that the on-duty monitor personnel keep a watchful eye on the R/T data and to record the data that is questionable, out of limit, or missing. This is a long and laborious process but there is no other way at this time.

III. Testing

The Monitor group has supported all *Mariner* Mars 1971 tests including the DSIF's operation verification tests. Monitor personnel have been able to locate potential problem areas and to define workaround procedures. Supporting the tests has given the group considerable insight as to the internal workings of the DSN and project.

The tests, for the most part, have been very good and the monitor system has operated well without too many problems. The software packages as shown in Table 1 all have operated as designed.

Documentation of the internal operating procedures has been hampered because the final system has not been determined. Consequently the Standard Operating Procedures that have been written have been in a constant state of modification.

The monitor's digital television formats have worked well and it is planned to update digital television formats within 2 days as outlined in DSN Monitor Document 820-4. The only limitation to the 2-day turnaround is getting the change into the computer system. The plan at this time is to have modifications added to the software on a weekly basis.

IV. Training

The monitor system, as part of the Network Analysis Team, adopted a minimum manning concept on Nov. 1,

1970. From Nov. 1, 1970 to March 29, 1971, minimum manning was provided in the Network Analysis area to support the *Pioneer* and *Mariner* Mars '69 Projects. *Mariner* Mars 1971 Project tests, facility tests and MOS training were supported as required.

An internal training program was established to familiarize personnel with the DSN Mark III software. Personnel developed new operating procedures and assisted in the development and testing of the new software packages operating in the IBM 360/75 computer. To date the following have been accomplished:

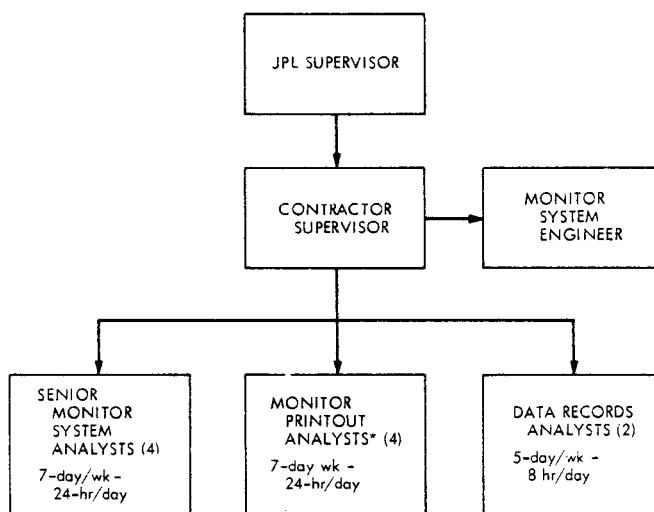
- (1) Training. Approximately 977 student hours of training have been received by 12 monitor personnel. This includes a week's trip to the Goldstone DSCC for tracking site familiarization.
- (2) Model II monitor software was accepted Feb. 12, 1971. This included the monitor criteria data (MCD) processor and raw high-speed data dump capability on 1443 line printer. The alarm processor will be implemented in future systems.
- (3) Data tables for the monitor criteria data sets have been redefined with realistic modes of operation. Some of the existing monitored parameters were modified, others were deleted or added.
- (4) An overlay has been designed for use on the high-speed data status performance block to assist in the identification and decoding of the bits within the blocks.
- (5) With the absence of computer driven alarm processors, digital television formats have been designed to support the real-time monitoring function. These formats were designed to easily detect a DSN alarm condition.
- (6) A reference library was established for the network analysis area consisting of all project documents and Standard Operating Procedures. These reference materials are being maintained by the data records analysts.

V. Staffing

The normal staffing of the Monitor Group contains one JPL supervisor and twelve contractors. The organization structure is as shown in Fig. 1.

Table 1. Software status

Name	Characteristic	Status
DSIF monitor	Station monitor console display	Delivered
	Alarms	Delivered
	Pseudo-residuals	Future system
	Output to DSN monitor (simultaneous with receipt of high-speed data input)	Delivered
	Original data record	Delivered
GCF monitor	Deep space station comm terminal monitor	Delivered
	SFOF comm terminal monitor	Delivered
	GCF monitor display	
	High-speed data configuration	Delivered
	Voice configuration	Delivered
	Teletype configuration	Delivered
SFOF monitor	High-speed data and commun- ication processor status	Delivered
	Status displays	
	High-speed data input status	Delivered
	User's terminal and display status	In checkout
	System status	Future system
DSN monitor	Interface status (communication processor, 1108)	Future system
	Monitor criteria data sets	
	Monitor criteria data set callup	Delivered
	Real-time modify	Delivered
	Retain modification	Delivered
	Generate alarms on teletype	Future system
DSN monitor	Generate alarms on printer	Future system
	Interface with facility monitor	
	DSIF	Delivered
	GCF	Delivered
	SFOF	Delivered, but limited
	Interface with telemetry	
	DSIF	Delivered
	SFOF	Future system
	Interface with tracking	
	DSIF	Delivered
	SFOF	Future system
	Interface with command	
DSN monitor digital television display	DSIF	Delivered
	SFOF	Future system
	Legibility	Delivered
	Capacity to handle 5 DSS, GCF and SFOF Facility monitor	Delivered
	Initial format assignment	Delivered
	R/T format change	
	2260 Keyboard or card reader	Delivered
	Format request box	Delivered
	Same format, multiple channels	Delivered
	Distribution to operation control team and network analysis team	Delivered



* THE PRINTOUT ANALYSTS WILL ASSIST THE MONITOR, TRACKING, TELEMETRY AND COMMAND SYSTEM ANALYSTS AS REQUIRED

Fig. 1. Monitor Group organization